

REMARKS

In response to the final office action mailed October 28, 2008, Applicants amended claims 19 and 24 and cancelled claim 20. Applicants present claims 1-10, 12-19, and 22-24 for examination.

The Examiner rejected claims 10 and 12-18 as being obvious over Cravino et al., *J. Mater. Chem.*, 2002, 12, 1931-1943 ("Cravino") in view of Sentein et al., *Optical Materials*, 9 (1998) 316-322 ("Sentein") and in view of Zhao et al., *Polymer*, 1995, 36(11), 2211-2214 ("Zhao") with supporting evidence provided by Dittmer et al., *Adv. Mat.*, (2000), 12(7), 1270-1274 ("Dittmer") and further in view of Gebeyehu et al., *Intl. J. Photoenergy*, 1999, 1, 1-5 ("Gebeyehu").¹ Claims 10 and 12-18 cover methods of treating a cell that include heating a photovoltaic cell for a period of time, and simultaneously subjecting the photovoltaic cell to an electric field, where the cell includes a photoactive layer that includes an electron donor and an electron acceptor that is a compound different from the electron donor. Applicants also do not concede that it would have been obvious (or even possible) for one skilled in the art to combine the references in the manner indicated by the Examiner. Further, even if the references were combined in the manner indicated by the Examiner, the result would not be the subject matter covered by claims 10 and 12-18. Applicants note that Sentein describes a photoactive material that is a diode-like polymer containing both a donor and an acceptor. (*See, e.g.*, Sentein, section 1, 2nd paragraph and section 2, 1st paragraph.) As would be understood by one skilled in the art, Sentein indicates that his photoactive material is an alternative to a photoactive material in which the electron donor is different from the electron acceptor. (*See, e.g., id.*, section 1, 1st and 2nd paragraphs.) Thus, when developing a method to treat a photovoltaic cell of the type covered by claims 10 and 12-18, one skilled in the art may not have even been considered Sentein. Certainly, Sentein would not have made it obvious to one skilled in the art to heat a cell and simultaneously subject the photovoltaic cell to an electric field, where the cell includes a photoactive layer that includes an electron donor and an electron acceptor that is a compound

¹ Applicants do not concede that the Examiner has accurately characterized the subject matter covered by claims 10 and 12-18 or the subject matter disclosed by Cravino, Sentein, Zhao, Dittmer or Gebeyehu.

different from the electron donor. Applicants also note that the Examiner seems to have misconstrued Gebeyehu. Gebeyehu relates to solar cells based on polymer/fullerene composites. (See, e.g., Gebeyehu, Title.) Gebeyehu discloses

One of the most important limiting factors in the performance of th[e] present types of molecular solar cells based on interpenetrating networks of conjugated polymers and fullerene derivatives is the charge carrier transport in the active layer. This transport is driven by the electrical field provided externally by the top and bottom electrodes with different work functions. (*Id.*, Abstract.)

Gebeyehu further discloses that “studies of conjugated polymer/fullerene photovoltaic devices showed, that the energy conversion efficiency is limited by the collection of charges at the electrodes” (*Id.*, Introduction, par. 1.) In addition, Gebeyehu discloses:

It has been shown that the charge transport between conjugated polymers and fullerenes is favorably tuned by electric field. The electric field due to the different electrodes is the driving force to collect the charges at the electrodes. Without this there will be no selection principle for the holes to travel to the ITO and for the electrons to go to the aluminum electrodes. (*Id.*, Materials and Methods, par. 2.)

Thus, when discussing electric field, Gebeyehu is referring to the electric field created during the use of his solar cells. Nowhere does Gebeyehu disclose or render obvious a method of treating a cell that includes subjecting the cell to an electric field. Nor does Gebeyehu make such a method obvious. Thus, even if the various references relied upon by the Examiner were somehow combined, the result would not be a method covered by claims 10 and 12-18. Further, the Examiner's attempt to take bits and pieces from the various references is nothing more than hindsight reasoning based on subject matter Applicants disclose in their specification. Such an approach by the Examiner is improper. In view of the foregoing, Applicants request reconsideration and withdrawal of the rejection of claims 10 and 12-18.

The Examiner also rejected claims 1-9 under 35 U.S.C. §103(a) as being obvious over Cravino in view of Sentin and in view of Zhao with supporting evidence provided by Dittmer

and further in view of Gebeyehu.² Claims 1-9 cover methods for the post-treatment of a photovoltaic cell that includes a photoactive layer including a conjugated polymer and a fullerene. The methods include heat treatment of a photovoltaic cell above a glass transition temperature of the conjugated polymer for a predetermined treatment time, where at least a portion of the treatment time is carried out under the influence of an electric field induced by a field voltage applied to the electrodes of the photovoltaic cell and exceeding a no-load voltage thereof. Applicants do not concede that it would have been obvious (or even possible) for one skilled in the art to combine the references in the manner indicated by the Examiner. Further, even if the references were combined in the manner indicated by the Examiner, the result would not be the subject matter covered by claims 1-9, for at least the reasons noted in the preceding paragraph. Moreover, the Examiner's attempt to take bits and pieces from the various references is nothing more than hindsight reasoning based on subject matter Applicants disclose in their specification. Applicants therefore request reconsideration and withdrawal of the rejection of claims 1-9.

The Examiner rejected claims 19, 20, 22 and 23 under 35 U.S.C. §103(a) as being obvious over Cravino in view of Sentein and in view of Zhao with supporting evidence provided by Dittmer.³ Applicants cancelled claim 20, so the rejection of this claim should be withdrawn. Claims 19, 22 and 23 cover methods of treating a photovoltaic cell that includes a photovoltaic layer including an electron donor and an electron acceptor that is different from the electron donor. The methods include heating the photovoltaic cell, and simultaneously subjecting the photovoltaic cell to an electric field. Applicants also do not concede that it would have been obvious (or even possible) for one skilled in the art to combine the references in the manner indicated by the Examiner. Further, even if the references were combined in the manner indicated by the Examiner, the result would not be the subject matter covered by claims 19, 22 and 23, at least because none of the references relied upon by the Examiner discloses or renders obvious subjecting a photovoltaic cell of the type covered by these claims to an electric field.

² Applicants do not concede that the Examiner has accurately characterized the subject matter covered by claims 1-9 or the subject matter disclosed by Cravino, Sentein, Zhao, Dittmer or Gebeyehu.

³ Applicants do not concede that the Examiner has accurately characterized the subject matter covered by claims 19, 20, 22 and 23 or the subject matter disclosed by Cravino, Sentein, Zhao or Dittmer.

Applicants note that Sentein describes a photoactive material that is a diode-like polymer containing both a donor and an acceptor. (*See, e.g.*, Sentein, section 1, 2nd paragraph and section 2, 1st paragraph.) As would be understood by one skilled in the art, Sentein indicates that his photoactive material is an alternative to a photoactive material in which one material serves as the electron donor and a different material serves as the electron acceptor. (*See, e.g., id.*, section 1, 1st and 2nd paragraphs.) Thus, when developing a method to treat a photovoltaic cell of the type covered by claims 19, 22 and 23, one skilled in the art may not have even been considered Sentein. Certainly, Sentein would not have made it obvious to one skilled in the art to heat a photovoltaic cell, and simultaneously subject the photovoltaic cell to an electric field, where the photovoltaic cell that includes a photovoltaic layer including an electron donor and an electron acceptor that is different from the electron donor. In addition, the Examiner's attempt to take bits and pieces from the various references is nothing more than hindsight reasoning based on subject matter Applicants disclose in their specification. Accordingly, Applicants request reconsideration and withdrawal of the rejection of claims 19, 22 and 23.

The Examiner also rejected claims 24 under 35 U.S.C. §103(a) as being obvious over Cravino in view of Sentein and in view of Zhao with supporting evidence provided by Dittmer.⁴ Claim 24 covers methods of treating a photovoltaic cell includes a photovoltaic layer including an electron donor and an electron acceptor that is different from the electron donor. The methods include heating the photovoltaic cell for a period of time, and simultaneously injecting charge carriers into the photovoltaic cell. Applicants also do not concede that it would have been obvious (or even possible) for one skilled in the art to combine the references in the manner indicated by the Examiner. Further, even if the references were somehow combined in the manner indicated by the Examiner, the result would not be the subject matter covered by claim 24, for at least the reasons noted in the preceding paragraph. Also, the Examiner's attempt to take bits and pieces from the various references is nothing more than hindsight reasoning based on subject matter Applicants disclose in their specification. As a result, Applicants request reconsideration and withdrawal of the rejection of claim 24.

⁴ Applicants do not concede that the Examiner has accurately characterized the subject matter covered by claims 19, 20, 22 and 23 or the subject matter disclosed by Cravino, Sentein, Zhao or Dittmer.

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Serial No. : 10/509,935
Filed : August 19, 2005
Page : 11 of 11

Attorney's Docket No.: 21848-0003US1 / KTA-002

Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: November 25, 2008

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